UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/084,016	02/27/2002	Andrew C. Gallagher	84095THC	6684

7590 12/14/2004		EXAMINER
Thomas H. Close		PERUNGAVOOR, SATHYANARAYA V
Patent Legal Staff		
Eastman Kodak Company	ART UNIT	PAPER NUMBER
343 State Street	2625	
Rochester, NY 14650-2201		

DATE MAILED: 12/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

		Application No.	Applicant(s)	
		10/084,016	GALLAGHER, ANDREW C.	
Office Action Summary		Examiner	Art Unit	
		Sath Perungavoor	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>02/27/2002</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-7</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-7</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>06/02/2003</u>.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____ .

DETAILED ACTION

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

1.   Claim 1 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. *10084006*. Although the conflicting claims are not identical, they are not patentably distinct from each other because the copending application discloses the same subject matter.

Claim 1 of instant application encompasses the subject matter that overlaps with the subject matter covered by claim 1 of the copending application as follows:

a) providing an image sharpener having a variable parameter of sharpening (Lines 11-13; Copending application discloses adaptive sharpening of image pixels with a gain map, which is the variable sharpening parameter.);

b) generating a noisy pixel belief map corresponding spatially to the image pixels having belief values indicating the likelihood that the modulation about respective pixels are due to system noise (Lines 8-10); and

c) using the noisy pixel belief map to vary the parameter of the image sharpener (Line 14; Copending application discloses the gain map, which consists of the noisy pixel belief map.).

While the copending application claim includes additional features not specifically recited in the instant application, the use of the transitional term "comprising" in the claim of the instant application fails to preclude the possibility of additional features or elements that are not specifically recited. Therefore, the claim of the instant application broadly encompasses the subject matter claimed in the copending application, so the scope of the instant claim and copending claim overlap and these claims are not patentably distinct.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2.   Claims 1, 5 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by

Song (US 5,038,388).

Regarding claim 1, Song discloses a method of sharpening a digital image

having image pixels according to its noise content, comprising the steps of (Fig. 2):

a) providing an image sharpener having a variable parameter of sharpening

(Equation 6; C*S in the equation correspond to the variable sharpener.);

b) generating a noisy pixel belief map corresponding spatially to the image pixels

having belief values indicating the likelihood that the modulation about respective pixels

are due to system noise (Equation 7; $V(i,j)$ generates the noise belief map, where the

variance magnitude can indicate the noise belief for a given pixel.); and

c) using the noisy pixel belief map to vary the parameter of the image sharpener

(Equation 7; S is a sharpening coefficient that varies with the noise belief map.).

Regarding claim 5, Song discloses the method claimed in claim 1, wherein the

digital image is a color digital image having two or more channels and including the

steps of forming a luminance channel as a weighted sum of the two or more channels;

and applying the image sharpener to the luminance channel (Equation 14 and 16; Col. 5

Lines 16-28; A color image consists of three channels and the cited art discloses a

weighted RGB channels to form the luminance channel and sharpening of the

luminance channel $x(i,j)$.).

Regarding claim 6, Song discloses the method claimed in claim 5, wherein the

noisy pixel belief map is generated using weighting coefficients employed in the

weighted sum (Equation 14 and 7; The generation of the belief map v(i,j) is determined

by x(i,j), which has the weighting coefficients.).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

3.   Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Song in

view of Guissin (US 5,442,462).

Regarding claim 2, Song meets all the claim limitations as set forth in the

discussion for claim 1.

However, Song does not disclose the noisy pixel belief map being derived from

the local signal to noise ratios.

Guissin discloses the noisy pixel belief map being derived from the local signal to

noise ratios (Col. 4 Lines 9-12; Signal to noise ratios are used to form the belief map,

which is used in adaptive weighting for sharpening and smoothing.)

It would have been obvious to one with ordinary skill in the art at the time of

invention to modify the teaching of Song with Guissin to create noisy belief map from

signal to noise ratios. Since, main objective is to generate the noise belief map for a given pixel and any method can be used and one can use the signal to noise method.

4.   Claims 4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Song in view of Guissin, and further in view of Reuman (US 6,069,982).

Regarding claim 4, Song and Guissin meet the claim limitations as set forth in the discussion for claim 2 and 5.

Song and Guissin disclose the method with a digital image consisting of two or more channels and generation of noisy pixel belief map (Song Col. 5 Lines 16-28; Guissin Col. 18 Lines 27-31; A color image consists of three channels and the cited art discloses development of noisy pixel belief map generation for color images.). Guissin discloses the calculating of the signal to noise ratio of at least one pixel and computing of the belief map from the signal to noise ratio (Col. 4 Lines 9-12; Signal to noise ratios are used to form the belief map, which is used in adaptive weighting for sharpening and smoothing.).

However, neither Song nor Guissin disclose the noise table indicating the relationship between pixel intensity and expected noise.

Reuman discloses the noise table indicating the relationship between pixel intensity and expected noise (Col. 5 Lines 58-62).

It would have been obvious to one with ordinary skill in the art at the time of invention to modify the teachings Song and Guissin with Reuman to construct a noise table and calculate the signal to noise ratio from that table. Since, LUTs are common

knowledge in the art and one would use them to speed up commonly occurring

operations.

Regarding claim 7, Song and Guissin disclose the method generating the noisy

pixel belief map from signal to noise ratio with weighted coefficients as set forth in the

discussion for claims 2, 5 and 6.

However, neither Song nor Guissin disclose a noise table showing the

relationship between pixel intensity and expected noise magnitude.

Reuman discloses the noise table indicating the relationship between pixel

intensity and expected noise (Col. 5 Lines 58-62).

It would have been obvious to one with ordinary skill in the art at the time of

invention to modify the teachings Song and Guissin with Reuman to construct a

weighted noise table for each channel and calculate the signal to noise ratio from that

table. Since, LUTs are common knowledge in the art and one would use them to speed

up commonly occurring operations. Weighting and multiple channel construction is a

trivial modification of single channel gray scale.

5.   Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Song in

view of Vuylsteke et al. (US 5,461,655).

Song meets the claim limitations as set forth in the discussion for claim 1.

However, Song does not disclose the generation of a noisy pixel belief map from the interpolated low resolution noisy pixel belief map, which is derived from the low resolution version of the digital image.

Vuylsteke et al. discloses the generation of a noisy pixel belief map from the interpolated low resolution noisy pixel belief map, which is derived from the low resolution version of the digital image (Col. 7 Lines 37-46; Col. 8 Lines 62-67).

It would have been obvious to one with ordinary skill in the art at the time of invention to modify the teaching of Song with Vuylsteke et al. to generate the above stated noisy pixel belief map. The computational intensity of low resolution image is lower than that of a detail image. In order to generate the noise belief map using less system resources, one would utilize a low resolution image.

Other Prior Art Cited

6.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Edgar (US 6,792,162) discloses the enhancement of images using noise estimates.
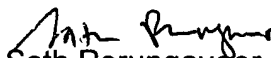
Contact Information

7.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sath Perungavoor whose telephone number is (703)

306-4116. The examiner can normally be reached on Monday to Friday from 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta whose telephone number is (703) 308-5246, can be reached on Monday to Friday from 9:00am to 5:00pm. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sath Perungavoor
Art Unit 2625
December 9, 2004

KANJIBHAI PATEL
PRIMARY EXAMINER